



3DEGREES

# Developing carbon credits for non-digester manure projects

PRESENTED TO:

SB1383 Subgroup #1

*May 21, 2018*

# Overview of offset opportunity evaluation

- + How might offset revenue help finance the project?
- + Estimate emission reductions
  - + Estimate baseline using AMMP, CAR/ARB Livestock calculator, custom tools, rule of thumb?
  - + Will not achieve 100% reductions in methane from baseline
- + Partner with a project developer who understands the market and how to monetize credits
  - + Number of credits per year  $\times$  market price
  - + Should also account for costs of Validation/Verification, Registration & Monitoring
- + Many farmers do not understand how to account for this annual line item in their budget
- + Offset projects must be registered within a year or so start date. Some farmers wait too long to seek offset registration. *How do we get the word out?*
- + Of course, don't forget a careful review of protocol eligibility



# What types of offset projects might be possible?



- + Capture and destroy the methane (digester, covered lagoon)
- + Solids separation
- + Solid separation with conversion from Flush to Scrape
- + Conversions from anaerobic to aerobic systems
- + Any others?

# How do they differ, from a developer perspective?

## + Digester (methane *capture and destruction*)

- + Proven technology
- + Registry & State adoption of protocols (no validation necessary)
- + Expensive
- + Complicated by destruction equipment and management (PPAs, Air Permits, H<sub>2</sub>S removal, etc.)
- + Must manage operational productivity and health of digester
- + Can accept other organic waste streams
- + High potential for other revenue streams and saleable bi-products



## + Solids separation (*reduction* in methane emissions)

- + Only as efficient as your separation technology. Table value defaults may be low\*
  - + 17% stationary screen
  - + 25% screw press
  - + 50% centrifuge
- + How can you demonstrate/prove site-specific removal efficiency?
- + Requires validation
- + Can be done in conjunction with a conversion from flush to scrape
- + Some opportunities for effluent feedstocks (biosolids)



\*U.S.EPA National Pollutant Discharge Elimination System (NPDES) Development Document, Chapter 5, “Industry Subcategorization for Effluent Limitations Guidelines and Standards”. Adapted from Moser et al. (1999).











## + Conversion from Anaerobic to Aerobic System

(*avoidance* of methane emissions)

- + Different technologies exist
  - + Most basic is pasturing
  - + Many are more technical and are new and/or unproven
- + Sampling/testing difficulties: How can conversion be demonstrated/proven?
- + What type of measurement techniques are available? COD is used in some wastewater treatment methodologies. Methane flux? May require outside expertise.
- + Requires validation
- + Little to no opportunity for other revenue streams or saleable biproducts



# Monitoring requirements may vary

REQUIREMENT	DIGESTER PROJECT	SEPARATION PROJECT
Track herd inventory, by category, per manure treatment type		
Track 15-minute biogas flow		
Lab sample for manure solids content before & after separator		
Maintain costly calibration of flow meters		
Track all project-related fuel use		

A low-angle photograph looking up at a construction bucket as it dumps a load of dark brown soil. The soil is falling in a stream, creating a dynamic trail of particles, and is about to land on a large, conical pile of the same material at the bottom of the frame. The background is a clear blue sky with some light, wispy clouds. The overall composition is vertical and emphasizes the height and action of the construction process.

# *Questions?*

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